

REMARKS

Claims 1, 2, 4 and 107-111 have been examined.

On July 8, 2010, the undersigned conducted an Interview with the Examiner to discuss the rejection under 35 U.S.C. § 112, second paragraph, as well as the prior art rejection of claims 1 and 110. The Examiner indicated that the proposed amendment of claim 108, to remove the term “high-speed,” should overcome the 112 rejection. With regard to the prior art rejection of claims 1 and 110, the Examiner indicated that the Stitz reference would be reconsidered in view of the amendment. The Examiner further indicated that he would contact the undersigned if additional amendments would be beneficial in overcoming the current prior art rejections.

Applicant submits that the above comments serve as a Statement of Substance of Interview.

I. Rejection under 35 U.S.C. § 112, second paragraph

The Examiner has rejected claim 108 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Accordingly, Applicant has amended claim 108 in a manner believed to overcome the rejection.

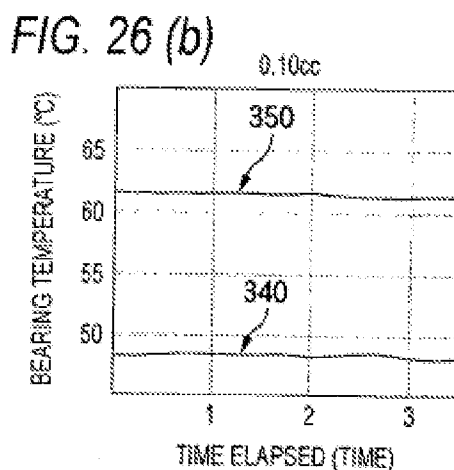
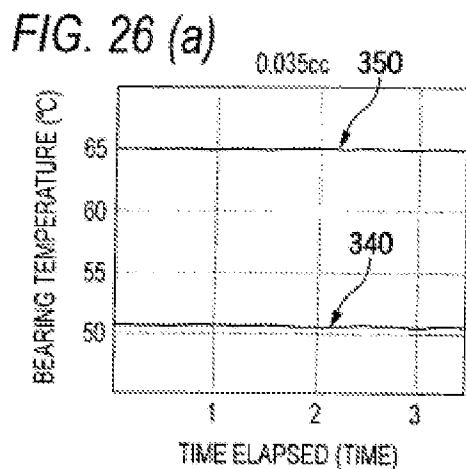
II. Rejections under 35 U.S.C. § 103(a) in view of U.S. Patent No. 5,711,615 to Stitz et al. (“Stitz”)

The Examiner has rejected claims 1, 2, 4, 107, 108 and 110 under 35 U.S.C. § 103(a) in view of Stitz.

A. Claim 1

Applicant submits that claim 1 is patentable over the cited reference. For example, claim 1 recites, “a grease supply system for supplying a grease to an inside of the rolling bearing; wherein the grease supply system supplies the grease such that a supply amount in one shot is set to 0.004 cc to 0.1 cc to prevent a temperature pulsation of the rolling bearing.” (emphasis added)

In the claimed invention, the upper limit of the supply amount of the grease in one shot is defined as 0.1 cc. An advantage of this feature is that *the generation of the temperature pulsation is prevented*, as shown in Figures 26(a) and 26(b) which are reproduced below.



Further, Applicant submits that the inventors have found that the generation of the temperature pulsation depends on the supply amount of the grease in one shot. More specifically, when the grease is shot into the inside of the rolling bearing by an amount exceeding a threshold, the temperature of the bearing increases temporarily in a pulsed manner, see, e.g., Figures 26(c) to 26(e), due to an increase in agitation resistance of the solid component of the grease and also due to an excessive amount of base oil of the grease at the contact portion between the rolling element and the raceway of the ring. As the rotation is further carried out thereafter, it returns to a steady state.

FIG. 26 (c)

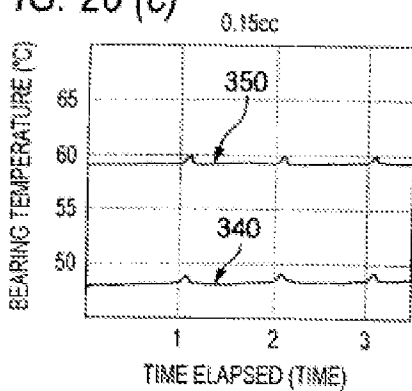


FIG. 26 (d)

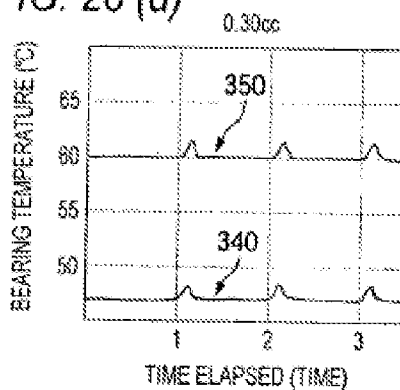
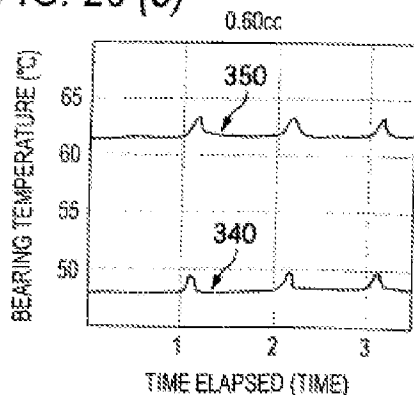


FIG. 26 (e)



Applicant submits that the temperature pulsation becomes a problem especially in a case of a machine tool, since the length of the spindle is changed due to a temporal change in temperature, thereby a machining precision is adversely affected.

Further, in a case where the spindle is rotated at a high speed, such as in a machine tool or in a high-speed motor, the temperature increase of the temperature pulsation lowers the viscosity of the base oil of the grease so that the grease film at the contact portion becomes thin, which may cause a metallic contact to result in a wear or a heat-seizure.

Turning now to the prior art rejection set forth in Office Action, the Examiner again asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention was made to configure the lubricant system of Stitz to supply between 0.004 cc and 0.1 cc of lubricant to the bearing, the motivation being to *optimize* the bearing performance for a particular application (pgs. 4 and 5 of Office Action). In this regard, the Examiner asserts that discovering an optimum value of a result effective variable involves only routine skill in the art.

In the February 12, 2010 Amendment, Applicant noted that a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. MPEP §2144.05(II)(B); *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Stitz is silent about the temperature *pulsation* and the grease as a lubricant. Thus, Applicant argued that Stitz fails to recognize "the supply amount of the grease in one shot" as a variable which *affects the temperature pulsation* in a grease lubrication system (i.e., not a result-effective variable).

In view of the foregoing, Applicant submitted that it would not have been obvious to one of ordinary skill in the art to reach the claimed range of the supply amount of the grease in one shot.

On page 6 of the present Office Action, the Examiner responds to the above arguments by acknowledging that Stitz does not discuss the “temperature pulsation” of a bearing, but alleges that the arguments in this regard are not commensurate in scope with the claim language. By this Amendment, however, Applicant has amended claim 1 to recite “to prevent a temperature pulsation of the rolling bearing.” Accordingly, Applicant submits that claim 1 is now commensurate in scope with the previously presented arguments. Thus, Applicant respectfully requests that the Examiner reconsider the rejection of claim 1.

Also, as set forth above, during the July 8, 2010 Interview, the Examiner indicated that he would contact the undersigned if additional amendments regarding temperature pulsation would be beneficial in overcoming the current prior art rejections.

At least based on the foregoing, Applicant submits that claim 1 is patentable over the cited reference.

B. Claims 2, 4, 107 and 108

Applicant submits that claims 2, 4, 107 and 108 are patentable at least by virtue of their dependency upon claim 1.

C. Claim 110

Since claim 110 recites features that are analogous to the features of claim 1 discussed above, Applicant submits that claim 110 is patentable for at least analogous reasons as claim 1.

III. Rejections under 35 U.S.C. § 103(a) in view of Stitz and Figures 113-121 and pages 1-11 of Applicant's specification ("AAPA")

The Examiner has rejected claims 107-111 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Stitz in view of the AAPA.

A. Claims 107-109

Since the AAPA fails to cure the deficient teachings of Stitz with regard to claim 1, Applicant submits that claims 107-109 are patentable at least by virtue of their dependency.

B. Claims 110 and 111

Applicant submits that claim 110 is patentable for at least analogous reasons as claim 1. Since the AAPA fails to cure the deficient teachings of Stitz, Applicant submits that claim 110 is patentable over the cited references. Also, claim 111 is patentable at least by virtue of its dependency upon claim 110.

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

AMENDMENT UNDER 37 C.F.R. § 1.114(c)
U.S. Application No.: 10/522,669

Attorney Docket No.: Q85994

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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